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Missoula Transportation Plan 1984 Update

Program Design

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MISSOULA TRANSPORTATION PLAN - 1984 UPDATE

PROGRAM DESIGN

PREPARED FOR:

MISSOULA PLANNING BOARD

BY

ROBERT PECCIA & ASSOCIATES

IN COOPERATION WITH:

MISSOULA TRANSPORTATION TECHNICAL ADVISORY COMMITTEE
MONTANA DEPARTMENT OF HIGHWAYS
FEDERAL HIGHWAY ADMINISTRATION

APRIL, 1984

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MISSOULA TRANSPORTATION PLAN - 1984 UPDATE

PROGRAM DESIGN

INTRODUCTION

The Urban Transportation Plan for Missoula was completed in 1967 using 1965 data, which makes the plan about 18 years old. The traffic assignment model was updated in 1974, and modifications to the transportation study area boundary have been made recently. However, the Urban Transportation Plan has not been updated since it was completed. Since Missoula has experienced significant growth and land use changes during the past two decades, certain elements of the original Transportation Plan have been implemented, some are obsolete and no longer appropriate, and some elements may still be valid. In order to identify current transportation problems and the improvements which are appropriate to relieving these problems, the Missoula County Planning Board in cooperation with the Montana Department of Highways and the Federal Highway Administration have decided to update the original Transportation Plan.

The first step in updating the Urban Transportation Plan is to develop a "program design". The intent of the program design is to provide a guide for conducting the study, and to estimate the work effort and costs associated with doing an updated Transportation Plan. This document contains the program design for the Missoula Transportation Plan - 1984 Update.

Because of limited staff, the Missoula Planning Board has chosen to use a private engineering and transportation planning firm to assist in preparing the program design and the Urban Transportation Plan Update. Therefore, the preparation of the Transportation Plan Update will be a joint effort of the Missoula Planning Board and the private firm with assistance and guidance from the Montana Department of Highways and the Federal Highway Administration.

PURPOSE & SCOPE

The purpose of the program design is to identify the work that needs to be done in order to prepare an Urban Transportation Plan Update. Therefore, the work that has been done for this program design has been limited to reviewing existing data and assessing the work that needs to be done. No actual work on the Transportation Plan Update has been done in this phase of the project.

DESCRIPTION OF TASKS

Task I: Complete Data Requirements

There is a substantial amount of data on transportation planning in Missoula that has become available since the 1965 Missoula Urban Transportation Plan was completed. This information includes:

1) Missoula Urban Transportation Plan;
2) Missoula Urban Transportation Study Update - 1974 Tech. Plan Reports #1 and #2;
3) Traffic Operations Program to Increase Capacity and Safety (TOPICS);
4) Missoula Transit Development Plan;
5) Missoula - A Policy Guide for Urban Growth;
6) Comprehensive Development Plan for Missoula, Montana;
7) 1980 Census of Population & Employment to Block Level;
8) City-Wide Street Right-of-Way & Condition Inventory;
9) State, City and County Traffic Counting Program; and
10) Transportation Improvement Program Annual Element.

In addition to this information, there is other data available such as information on traffic signals, air quality studies, transportation improvement priorities established by the Missoula Transportation Policy Coordinating Committee (PCC), committed transportation system improvements, and other data applicable to an urban transportation plan.

The information available has been reviewed and the following data deficiencies have been noted:

1) An assessment of future land use and community growth will have to be made;
2) Current & projected population and employment, estimated by transportation zones, will need to be done; and
3) Detailed pavement condition surveys and analyses will be required.

The Transportation Plan is based on future land use and is intended to meet the transportation needs of Missoula as the community grows. The Transportation Plan is an essential part of the overall planning process, and needs to be integrated into the Comprehensive Plan for Missoula. It appears at this time that the Transportation Plan will be done slightly before the Comprehensive Plan, which is in the process of being updated. Therefore, a "best estimate" of future land use and community growth will be made on which the Transportation Plan will be based.

The present conditions and future growth of Missoula will be reflected in the population and employment estimates and predictions. These parameters will be determined by Transportation Zone for use in the traffic as-

signment model. At this time, the Missoula Planning Office is considering using an urban transportation planning computer package available from the Bureau of the Census that will compute population and employment by zone.

An inventory of the available right-of-way and physical characteristics and condition of the major streets will be done. The information contained in the 1965 Transportation Study and the City and County of Missoula records will be used as base data and updated to current conditions.

Also, more detailed information on traffic will be useful in describing and assessing the transportation situation in Missoula. Traffic data collection efforts will include traffic counts, turning movement counts, travel time and delay studies, and speed restricted areas.

Traffic counts are done at about 136 locations in Missoula using portable traffic counters. These counts are usually done for a two- or three-day period and then seasonally adjusted to provide an annual average daily traffic estimate. A permanent traffic counter that provides a continuous traffic count is located at the south end of the Orange Street Bridge over the Clark Fork River. These counts should provide sufficient information on traffic volumes in Missoula. If additional counts are required, in addition to those normally done by the Montana Department of Highways, they will be done as necessary. The additional counts will likely include cut line, screen line, and cordon line counts at specific locations in order to confirm the validity of the traffic model.

Peak hour turning movement counts will be done at the major intersecting streets in Missoula to provide data for signal system analysis, lane usage, and capacity analyses at intersections. It is estimated that turning movement counts will be taken at about 30 intersections.

Travel time and delay studies will be done at peak and off-peak periods on the longest and most continuous streets on the major street network using the Floating Car Method. These would include at a minimum Brooks, Orange, Higgins, Broadway, Russell, South, Third, Van Buren, Pattee Canyon, and Mullan Road.

Speed restrictions on the major street network would be located and described. This will include speed limits, school zones, and other speed-restricted areas.

At the conclusion of this task, existing information will be compiled into an indexed data base file, additional data will have been collected to fill deficiencies in the data base, and future estimates of population and employment by zone will have been completed.

Task II: Evaluate and Update Traffic Assignment Model

The most recent computer model for traffic assignments was done in 1975 using 1974 data. This model should be updated to provide a more current model on which major street network improvement alternatives can be evaluated.

The first adjustment would be to modify the transportation study area boundary if required. Since the original transportation study area included most of the projected growth areas around Missoula, it is expected that only minor modifications in the boundary will be necessary. Another adjustment that may be required will be in the number and size of transportation zones. Some of the zones that were used for the 1974 model have had significant development, and it may be desirable to add additional zones as a refinement.

An update of the existing plus committed street network system may also be required. This will include changing the street network lengths where the boundary may be changed, adding in improvements that have been completed since the 1974 model, and including presently committed improvements that will be completed or under contract by 1985. These network changes will be coded into the link-node network to provide an updated street network system.

Local approval of the socio-economic data, the transportation study area boundary, and the major street network will be requested at this stage of the project to avoid conflicts on these elements of the transportation study at a later date.

An evaluation of the ability of the 1974 model to predict traffic will be done by comparing 1983 actual traffic counts to the 1985 traffic predictions at cordon and cut lines. If the counts are close to the predictions, then the model will be considered to be valid. Also the land use, population, and employment projections contained in the 1974 model will be compared to current estimates and projections.

It is assumed for this program design that the projections used for the 1974 traffic assignment model will be relatively close and that only minor adjustments will be necessary in order to update the model. If this is not the case, then the condition of the model will be discussed with the Missoula TAC, and a decision on how much effort should be spent to achieve an accurate model will be made.

The result of this task will be a computer traffic assignment model that will be capable of predicting traffic on major street network alternatives.

Task III: Conduct Analyses

There are several analyses that are necessary in order to assess the effectiveness of the existing transportation system, and to identify the need for certain improvements.

A traffic capacity analysis will be made to determine the level of traffic service that is presently being provided by the major streets in Missoula, and where capacity deficiencies exist.

An assessment of the bikeways in Missoula will be done in cooperation with the Missoula Bikeway Coordinator. The purpose of this analysis is to identify the major bikeway routes, and to best assess how they can be incorporated into future transportation improvements.

An accident study will be done to identify areas that have an above-average accident rate, and to provide indications of where hazardous elements of the transportation system may be located.

An analysis of the signal systems will be made to establish the effectiveness of the traffic signals on the major street network. The analysis would consist of an inventory of each signal, field observations on the efficiency of the signals, and an evaluation of the type of signal being used. It is not intended that detailed phase diagrams, time-space diagrams or controller and interconnect systems be evaluated. For this subtask, a qualified traffic signal specialist will be retained to assist in the analysis.

An assessment of the parking situation, particularly in the downtown area, will be established by examining previous parking studies and determining actual parking conditions in the field.

Task IV: Determine Present and Future Transportation Problems

From the traffic assignment model, the capacity analysis, and the travel time and delay study, deficiencies on the major street network can be identified. These deficiencies will consist of an inadequate street in the existing network or additional streets that may be required.

In addition to network deficiencies, there will likely be localized problem areas which have high accident rates, long intersection delays, or which may be operating at a poor level of service. These areas will be identified and the specific problem(s) described.

Some of the streets on the existing street network may not be in proper condition to fulfill their function even though their configuration may be adequate. The streets that are in poor condition will be identified, and the problems with their condition will be described.

In addition, there may be other problems such as poor air quality due to traffic congestion. To the extent that information is available, these problems will be identified and described.

The Missoula Transportation Policy Coordinating Committee (PCC) has selected improvements to be implemented in the near future. Unless the PCC directs otherwise, these improvements will be considered to be committed projects and will be included in the Transportation Plan as such.

The objective of the problem identification task is to determine where the deficiencies in the Missoula transportation system occur so that a program of improvements can be targeted to relieve these deficiencies. The problem identification phase provides the logic by which a transportation system improvement is needed and the type of improvement that is appropriate. The result of this task will be a description of the transportation problems that now occur in Missoula, and the major problems that are expected to occur in the future.

Task V: Establish Financial Limitations

An effective transportation plan must be financially practical. During this task, available funding sources will be identified, expenditures that are committed for use on projects or for operation and maintenance will be determined, and an estimate of the funds available for transportation system improvements will be estimated. The financial limitations will restrict the kinds and extent of transportation system improvements that will be practical for the planning period.

Task VI: Establish Major Street Network Improvements Plan

Some of the improvements contained in the 1965 Transportation Plan may not have been done and may still be valid. Also, there are likely a number of other improvements that have been identified but may not be included in the Transportation Plan. The improvements will be listed and evaluated to see if they are still valid.

During the traffic assignment modeling, deficiencies in the major street network may become apparent. Alternatives to resolving these deficiencies will be developed and tested on the traffic assignments model to determine their effectiveness.

The costs of the most effective and appropriate network improvements will be estimated. These estimates will be compared with the Financial Plan to determine if the anticipated improvements are financially feasible.

The results of this task will be a listing of street network improvements that will address the identified deficiencies within the limits of available

financing. A traffic assignment will be done on the expected improvements to predict the impact of the improvements on traffic.

Task VII: Establish Transportation System Management (TSM) Plan

The detailed traffic studies will identify those locations where there are problems in traffic operations. In most cases there will be a traffic operation type of improvement that will relieve the specific deficiency. These traffic operation improvements will be developed for each area where traffic deficiencies occur.

For each of these improvements, an estimate of the costs will be made. These costs will be compared with financial limitations to determine if the improvements are financially feasible.

The results of this task will be a Transportation System Management (TSM) Plan that identifies and describes the improvements needed to relieve traffic operation type deficiencies within the limits of available financing.

Task VIII: Central Business District Traffic Circulation Plan

The Central Business District is an area that has special problems relating to traffic circulation, and will be subject to a separate investigation. The area to be studied extends from the Clark Fork River on the south to the Burlington Northern Railroad on the north and from Orange Street on the west to Washington Street on the east.

The initial step will be to conduct a physical inventory of the facilities relating to traffic circulation including street right-of-way, street paving, traffic control devices, sidewalks, pedestrian crossings, etc. Aerial photographs at a scale of 1" = 50' will be used to assist in the inventory.

There have been a number of studies in the downtown area including a Downtown Parking Program. These studies will be reviewed and any committed improvements and adopted policies will be identified and considered during the development of the Traffic Circulation Plan.

In addition to vehicular traffic, the CBD has a substantial amount of pedestrian traffic. The pedestrian volumes and facilities will be inventoried and analyzed to determine how well they are fulfilling their function.

Problems associated with driver or pedestrian confusion due to lack of directions, traffic congestion, or inadequate facilities will be identified. A Traffic Circulation Plan for the study area which will concentrate on

relieving problems that have been identified will be developed. It is expected that right-of-way will be limited and construction in this area will be expensive, and that most of the recommended improvements will be related to traffic operations as opposed to major construction improvements.

Task IX: Complete Other Transportation Plan Elements

Other elements required in a transportation plan include the assessing the impact on air quality, assessing energy requirements, providing a data base for future transportation planning efforts, and establishing a procedure to keep the transportation plan current. These elements will be conducted and included in the Missoula Transportation Plan.

Task X: Prepare Displays and Reports

During the course of the study, a large amount of technical information will have been gathered, and a number of analyses will have been done. This background information will be put into technical supplement documents for future reference. At the completion of the study, draft and final reports will be prepared. These reports will contain the methods and procedures used to develop the Transportation Plan and the final conclusions and recommendations. Liberal use of graphics will accompany the text to make the Plan easily understood. If desired, a public information pamphlet will also be prepared for general distribution.

Task XI: Reviews and Public Involvement

During the transportation planning process, it will be necessary to provide information to the Missoula Transportation Technical Advisory Committee, the public, and local government agencies. The best means of explaining the work done is to prepare a series of graphics on the process and the results of analyses. These graphics will be used to present information at the TAC monthly meetings, public information meetings, and the public hearing on the Transportation Plan. In addition, during the course of the study, information will be disseminated periodically through the use of press releases.

MISSOULA URBAN TRANSPORTATION PLAN - 1984 UPDATE

OUTLINE OF WORK TASKS

TASK I: COMPLETE DATA REQUIREMENTS

1. Assess Future Growth of Community
2. Project Population & Employment for 1980, 1990, 2000 and 2010 by Transportation Zone
3. Conduct Street Right-of-Way & Pavement Condition Analysis
4. Conduct Traffic Counts as Required
5. Conduct Travel Time & Delay Study
6. Identify Speed Restrictions
7. Identify Previous Transportation Commitments

TASK II: EVALUATE & UPDATE TRAFFIC ASSIGNMENT MODEL

1. Adjust Transportation Study Area Boundary if Required
2. Examine Transportation Zones & Modify as Necessary
3. Update Existing Plus Committed Major Street Network if Necessary
4. Request Local Approval of Socio-Economic Data, Boundary, & Street Network
5. Adjust Model to Conform to Current Conditions

TASK III: CONDUCT ANALYSES

1. Traffic Capacity Analysis
2. Bikeway Analysis
3. Accident Analysis
4. Traffic Signal System Analysis
5. Parking System Analysis

TASK IV: DETERMINE PRESENT & FUTURE TRANSPORTATION PROBLEMS

1. Identify Major Street Network Deficiencies
2. Identify Traffic Operation Problems
3. Determine Other Transportation-Related Problems

TASK V: ESTABLISH FINANCIAL LIMITATIONS

1. Identify Available Funding Sources
2. Determine Committed Expenditures
3. Identify Alternative Funding Proposals
4. Estimate Available Funding for Transportation Improvements
5. Review & Obtain Local Approval of Financial Program

OUTLINE OF WORK TASKS
(cont.)

TASK VI: ESTABLISH MAJOR STREET NETWORK IMPROVEMENTS PLAN

1. Evaluate Previously Recommended Improvements
2. Identify Feasible Major Street Network Improvement Alternatives
3. Test Alternatives on Traffic Assignments Model
4. Estimate Costs of Improvements
5. Compare Costs of Improvements to Financial Limitations
6. Select an Effective & Practical Major Network Improvement Program

TASK VII: ESTABLISH TRANSPORTATION SYSTEM MANAGEMENT (TSM) PLAN

1. Identify Improvements to Relieve Traffic Operation Problems
2. Estimate Costs of Improvements
3. Compare Costs of Improvements to Financial Limitations
4. Establish TSM Plan

TASK VIII: CENTRAL BUSINESS DISTRICT TRAFFIC CIRCULATION PLAN

1. Inventory Physical Facilities in Study Area
2. Review CBD Programs
3. Complete Pedestrian Analysis
4. Identify Traffic Circulation Problems
5. Prepare Traffic Circulation Plan

TASK IX: COMPLETE OTHER TRANSPORTATION PLAN ELEMENTS

1. Air Quality Assessment
2. Energy Impact Assessment
3. Organize & Index Data Base File
4. Identify Procedures for Continuing Transportation Planning Efforts

TASK X: PREPARE DISPLAYS & REPORTS

1. Prepare Displays for Meetings & Presentations
2. Write Descriptive Narrative
3. Prepare Technical Supplement Documents
4. Prepare Draft & Final Summary Reports
5. Prepare & Print Public Information Pamphlet

TASK XI: REVIEWS & PUBLIC INVOLVEMENT

1. Attend TAC Meetings
2. Hold Public Information Meetings
3. Attend Public Hearing on Transportation Plan
4. Provide Text & Graphics for Press Releases

PERSON—DAY ESTIMATES

WORK TASK	SUBTASK	PRINCIPAL ENGINEER	TRAFFIC ENGINEER	PROJECT PLANNER	EDITOR/ TYPIST	GRAPHIC DESIGNER	TOTAL	MPO STAFF
1. Complete Data Requirements	1.1 Assess Future Growth	1	1					6
	1.2 Project Population & Employment		2				2	20
	1.3 Street Right-of Way & Pavement Condition		4	2			6	
	1.4 Traffic Counts		3	3			6	
	1.5 Travel Time & Delay Study		8				8	8
	1.6 Speed Restrictions		2	2			4	
	1.7 Previous Transportation Commitments	1	1				2	
2. Evaluate & Update Traffic Assignment Model	2.1 Adjust Boundary							2
	2.2 Modify Zones							5
	2.3 Update Major Street Network	1	1				2	
	2.4 Obtain Local Approvals	1	1				2	
	2.5 Adjust Modal		4				4	
3. Conduct Analyses	3.1 Traffic Capacity		10				10	
	3.2 Bikeway Analysis		1	3			4	
	3.3 Accident Analysis		5	10			15	
	3.4 Traffic Signal System		8				8	
	3.5 Parking System		4	2			6	
4. Transportation Problems	4.1 Major Street Network Deficiencies	1	3				4	
	4.2 Traffic Operation Problems	2	6	3			11	
	4.3 Other Problems	1	2				3	
5. Financial Limitations	5.1 Identify Funding Sources							3
	5.2 Committed Expenditures							2
	5.3 Alternative Funding Proposals	2					2	1
	5.4 Estimate Available Funding	2					2	3
	5.5 Local Approval of Financing							2
6. Major Street Network Plan	6.1 Evaluate Previous Commitments	1	1				2	
	6.2 Identify Improvement Alternatives		3				3	
	6.3 Test Alternatives on Model		3				3	
	6.4 Estimate Costs		10				10	
	6.5 Compare Costs to Funding		2				2	
	6.6 Select Improvement Program	2	3				5	
7. Transportation System Management Plan	7.1 Identify Improvements	2	22	4			28	
	7.2 Estimate Costs		10				10	
	7.3 Compare Costs to Funding		3				3	
	7.4 Establish TSM Plan	1	4				5	
8. CBD Traffic Circulation Plan	8.1 Inventory Physical Facilities		3	5			8	
	8.2 Review CBD Programs		1				1	
	8.3 Perform Pedestrian Analysis		2	10			12	
	8.4 Identify Traffic Problems		3				3	
	8.5 Prepare Traffic Circulation Plan	1	4				5	
9. Complete Other Elements	8.1 Air Quality Assessment		3				3	
	8.2 Energy Impact Assessment		2				2	
	8.3 Data Base File		5				5	
	9.4 Continuing Planning Efforts	2	2				4	
10. Displays & Reports	10.1 Prepare Displays					5	5	
	10.2 Write Narrative	2	2	2	5		11	
	10.3 Technical Supplements	1	4	3	3		11	
	10.4 Draft & Final Reports	2	6	3	5	5	21	
11. Reviews & Public Involvement	11.1 Attend TAC Meetings	6	6				12	
	11.2 Hold Public Information Meetings	2	4			2	8	
	11.3 Hold Public Hearing	1	2			2	5	
	11.4 Prepare Press Release	1	3		2		6	
TOTAL		36	179	52	15	14	296	52

PROJECT LABOR COST

Position	Person-Days	Person-Hours	Rate	Total
Principal Engineer	36	288	$15.13	$4,357.44
Project Engineer	179	1432	12.30	17,613.60
Project Planner	52	416	9.75	4,506.00
Editor/Typist	15	120	6.92	830.40
Graphic Designer	14	112	7.96	891.52
Totals:	296	2368	--	$27,748.96

DIRECT JOB COSTS

Printing	$4,000.00
Materials and Supplies	200.00
Mileage (3,600 mi. @ $.25)	900.00
Per Diem (30 days @ $20/day)	600.00
Miscellaneous Expenses	100.00
Total:	$5,800.00

COST SUMMARY

1.	Direct Labor	$27,748.96
2.	Salary Additives (.26802 x Direct Labor)	7,437.19
3.	Direct Payroll Costs	35,186.15
4.	Direct Job Costs	5,800.00
5.	Total Direct Costs	40,986.15
6.	Indirect Costs (.70743 x Payroll)	24,891.71
7.	Total Costs	65,877.86
8.	Profit	7,922.14
9.	Total Robert Peccia & Associates Project Costs	$73,800.00